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Hans Kristian Kotlar

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Ballard Spahr LLP

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ATLANTA, GA 30309-3915

EXAMINER

KAPUSHOC, STEPHEN THOMAS

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/526,512	Applicant(s) KOTLAR ET AL.	
	Examiner STEPHEN KAPUSHOC	Art Unit 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 17-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-24 are pending.

Claims 17-24 are withdrawn from examination as detailed in the Office Action of 01/07/2009.

Claims 1-16 are examined on the merits.

Please Note: The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This Office Action is in reply to Applicants' correspondence of 07/07/2009.

Applicants' remarks and amendments have been fully and carefully considered but are not found to be sufficient to put the application in condition for allowance. No new grounds of rejection are presented in this Office Action. Any rejections or objections not reiterated herein have been withdrawn in light of the amendments to the claims or as discussed in this Office Action.

This Action is made **FINAL**.

Withdrawn Claim Objections

1. The objections to claim 3 and 16, as presented on pages 2-3 of the Office Action of 01/07/2009, is **WITHDRAWN** in light of the amendments to the claims.

Withdrawn Claim Rejections - 35 USC § 112 2nd ¶ - Indefiniteness

2. The rejections of claims 1-11, 15 and 16 under 35 U.S.C. 112, second paragraph, as set forth on pages 3-4 of the Office Action of 01/07/2009, are **WITHDRAWN** in light of the amendments to the claims.

Maintained Claim Rejections - 35 USC § 102

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3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Orphan et al (2000) (citation A13 on the IDS of 02/06/2006).

Regarding claim 1, Orphan et al teaches a genotypic analysis of a sample and detecting the presence of thermophilic microorganisms (e.g.: p.700 – Abstract; p.701 – Construction and screening of 16S rDNA libraries; Cloning). Furthermore, Orphan et al teaches that analyzed genetic samples are related to organisms cultured from high-temperature oil-bearing formations.

Regarding claims 2-4, Orphan et al teaches analyses of samples from production wellheads that originate from a sub-surface formation (claim 2), an oil/water mixture comprising oil and water exposed to oil (claims (3 and 4) (e.g. p.701 – Site description and reservoir conditions; Nucleic acid extraction).

Regarding claim 5, Orphan et al teaches creating information regarding microorganisms present in an ongoing production process (e.g.: p.701 – Site description and reservoir conditions; Fig 1). It is noted that the claim does not set forth any particular methods steps required for the information to be 'utilised' in the process, as such the methods of generating the information are considered utilization of the information.

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Regarding claims 6 and 7, Orphan et al teaches detecting a plurality of microorganisms to generate a sample profile (claim 6) and comparisons to reference profiles (e.g. p.705 – Comparison between 16S rDNAs from isolates to those directly recovered in libraries).

Regarding claim 8, Orphan et al teaches using primers to generate archaeal libraries and universal libraries (p.701 – Construction and screening of 16S rDNA libraries), where such methods are suitable for the analysis of the presence of the organismal genera recited in claim 8.

Regarding claim 9, Orphan et al teaches methods of analysis which do not require a culturing step (p.701 – Construction and screening of 16S rDNA libraries).

Regarding claims 10 and 11, Orphan et al teaches creating libraries of PCR amplified (relevant to claim 11) 16S rDNA sequences (p.701 – Construction and screening of 16S rDNA libraries), which is a method in which the sample is contacted with one or more different oligonucleotides (relevant to claim 10) designed to hybridize to regions of nucleic acid from the microorganisms.

Regarding claim 12, Orphan et al teaches the analysis of samples from the Miocene Monterey formation, which is a hydrocarbon zone that is characterized such that information about the sulphur content of the oil is obtained (e.g. p.708, left col., Ins.5-10).

Regarding claim 15, Orphan et al teaches analysis of an oil reservoir (p. 701 – Sire description and reservoir conditions).

Response to Remarks

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Applicants have traversed the rejection of claims under 35 USC 102 as anticipated by Orphan et al. Applicants' arguments (p.7-8 of Remarks) have been fully and carefully considered but are not found to be persuasive.

Applicants have argued that claim 1 recite "a method of detecting, characterizing, or monitoring a hydrocarbon zone", where Orphan et al teaches only that microorganisms in formation water samples are phylogenetically related to certain organisms. The argument is not persuasive. As cited in Applicants remarks, Orphan et al clearly indicates that the microbes in the formation test sample 'are closely related to thermophilic strains cultured from both the Monterey and other high-temperature oil-bearing formations". Thus the teachings of Orphan et al clearly provide the same active process step as required by the claimed methods (i.e. performing genotypic analysis), and also include the teaching that the detected genotypes are indicative of oil-bearing formations. As such the Examiner maintains that the teachings of the reference satisfy the limitations of the claims, where claim 1 recites 'wherein the presence or absence of said one or more thermophilic or extremophilic microorganisms indicates (1) the presence or absence of a hydrocarbon zone.

Further, while Applicants argue that the specification defines 'properties of the hydrocarbon zone', it is noted that the portion of the specification cited in the Remarks provides only examples of parameters that may be measured as 'properties', but does not in fact present those parameters as a limiting definition of 'properties' of a zone. Additionally, the limitation of '(2) the properties of the hydrocarbon zone' is presented as an alternative to '(1) the presence or absence of a hydrocarbon zone', and thus the

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element recited as '(2)' in the claim is not required for the claimed method if element (1) is present. Similarly, where the preamble recites in the alternative 'detecting, characterizing, or monitoring a hydrocarbon zone', the method of the prior art which teaches any one of the aforementioned elements satisfies the limitations of the claims. Finally, the presentation of the final wherein clause, because of its presentation as a wherein clause, is not presented as an active method step that would in fact require the drawing and analysis of multiple sample over time, and the comparison of those samples to create some type of diagnostic conclusion.

The rejection as set forth is **MAINTAINED**.

Maintained Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Orphan et al (2000) (citation A13 on the IDS of 02/06/2006) in view of Blume et al (2002).

Orphan et al teaches a genotypic analysis of a sample and detecting the presence of thermophilic microorganisms. Furthermore Orphan et al teaches the analysis of samples originating from different oil reservoirs with different depths and the detection of different microorganisms in the different samples (e.g. Table 1). Orphan et

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al does not specifically teach that different microorganisms are indicative of certain depths.

However, the association of particular microbial profiles with different particular geological depths was well known in the art at the time the invention was made.

Blume et al teaches the analysis of microbial community structure as a function of sample depth (e.g.: p.173 – Microbial biomass and microbial diversity; p.176 – Microbial community structure).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have performed an association analysis between detected microorganisms and depth, as taught by Blume et al, in the analysis of microorganisms detected in oil reservoir production fluids as performed by Orphan et al. One would have been motivated to performed an association analysis between detected microorganisms and depth based on the teaching of Orphan et al that different type of organisms are identified in samples originating from sources from different depths (Table 1).

Response to Remarks

Applicants have traversed the rejection of claims under 35 USC 103 as obvious in light of Orphan et al in view of Blume et al. Applicants' arguments (p.8-10 of Remarks) have been fully and carefully considered but are not found to be persuasive.

Initially it is noted that Applicants arguments drawn to the deficiencies of Orphan et al in teaching methods of detecting a hydrocarbon zone, or characterizing a hydrocarbon zone, have been in the previous response to remarks in the Office Action.

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The teachings of Blume et al are not presented in the rejection to overcome any deficiencies of Orphan et al with regard to detecting a hydrocarbon zone. The teachings of Blume et al are presented to establish that it was well known in the art at the time the invention was made that various particular microorganisms were known to be present at, and thus indicative of, particular soil depths.

The rejection as set forth is **MAINTAINED**.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Orphan et al (2000) (citation A13 on the IDS of 02/06/2006) in view of Rawat et al (1994) (citation A14 on the IDS of 02/06/2006).

Orphan et al teaches a genotypic analysis of a sample and detecting the presence of thermophilic microorganisms. Furthermore Orphan et al teaches the analysis of samples originating from different oil reservoirs with different depths and the detection of different microorganisms in the different samples (e.g. Table 1). Orphan et al does not specifically teach that the migration route of a hydrocarbon zone is determined.

However, the analysis of hydrocarbon zone migration routes was well known in the art at the time the invention was made.

Rawat et al teaches the geo-microbial methods may be used for the exploration for hydrocarbons.

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have used the methods of Orphan et al in an analysis of

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hydrocarbon zone migration routes. One would have been motivated to do so based on the teachings of Rawat et al that geo-microbial methods may be used to explore for hydrocarbons, and the results of Orphan et al that particular microorganism profiles are indicative of fluids obtained from hydrocarbon reservoirs.

Response to Remarks

Applicants have traversed the rejection of claims under 35 USC 103 as obvious in light of Orphan et al in view of Rawat et al. Applicants' arguments (p.10-11 of Remarks) have been fully and carefully considered but are not found to be persuasive.

Initially it is noted that Applicants' arguments drawn to the deficiencies of Orphan et al in teaching methods of detecting a hydrocarbon zone, or characterizing a hydrocarbon zone, have been in the previous response to remarks in the Office Action. Applicants have argued that the methods of Rawat et al are only reliable if the geology of the analyzed region is relatively uncomplex. The argument is not found to be persuasive. It is noted that the rejected method makes no limitation on any complexity of the geology of any analyzed region. As such, in the generic breadth of the claim, the Examiner maintains that Rawat et al provides teachings of geo-microbial methods to explore hydrocarbon migration routes, and that combining the methods of Rawat et al with the methods of Orphan et al would have been obvious to the skilled artisan.

The rejection as set forth is **MAINTAINED**.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Orphan et al (2000) (citation A13 on the IDS of 02/06/2006) in view of Muyzer et al (1993).

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Orphan et al teaches a genotypic analysis of a sample and detecting the presence of thermophilic microorganisms. Furthermore Orphan et al teaches the analysis of samples originating from different oil reservoirs with different depths and the detection of different microorganisms in the different samples (e.g. Table 1). Orphan et al does not specifically teach an analysis performed using SEQ ID NO: 1 (as consonant with the Election).

However, methods for the analysis of microbial populations were well known in the art at the time the invention was made, including methods comprising the use of a probe with the sequence of SEQ ID NO: 1.

Muyzer et al teaches methods for the amplification of 16s rDNA sequences from mixed populations of microbes, including methods using a probe with the sequence set forth in SEQ ID NO: 1 (i.e. the sequence of 'primer 1' (p.696 - PCR) of Muyzer et al is identical to SEQ ID NO: 1 of the instant application).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have used the primer according to Muyzer et al in the analysis of samples as performed by Orphan et al. Such a combination of methods would be the simple substitution by an element known in the prior art where the primer as used in Muyzer et al would be used in the same method of amplification as taught in Orphan et al. One would have been motivated to use the primer of Muyzer et al to provide additional alternative reagents and methods, where Muyzer et al teaches the successful use of the reagents and methods.

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Applicants have traversed the rejection of claims under 35 USC 103 as obvious in light of Orphan et al in view of Muyzer et al. Applicants' arguments (p.8-10 of Remarks) have been fully and carefully considered but are not found to be persuasive.

It is noted that Applicants arguments' drawn to the deficiencies of Orphan et al in teaching methods of detecting a hydrocarbon zone, or characterizing a hydrocarbon zone, have been in the previous response to remarks in the Office Action. The teachings of Muyzer et al are not presented in the rejection to overcome any deficiencies of Orphan et al with regard to detecting a hydrocarbon zone. The teachings of Muyzer et al are presented to establish that is was well known in the art at the time the invention was made to use the particular probe sequence of the rejected method in the analysis of microbe populations.

The rejection as set forth is **MAINTAINED**.

Conclusion

9. No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Kapushoc whose telephone number is 571-272-3312. The examiner can normally be reached on Monday through Friday, from 8am until 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James (Doug) Schultz can be reached at 571-272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

/Stephen Kapushoc/
Primary Examiner, Art Unit 1634